

Device for controlling a vehicle

The present invention relates to an apparatus for controlling a vehicle, in particular an aircraft, helicopter or else a simulator, having a handle which is mounted such that it can move about two approximately mutually perpendicular axes.

Apparatuses such as these are known and are commercially available on the market in many forms and versions. They are essentially used for controlling aircraft, helicopters, flight simulators or the like. In this case, a handle can be pivoted essentially about two axes in order, for example, to control a helicopter, in particular its rotor.

Conventional apparatuses have the disadvantage that they are large, complex and costly, in particular with different linkages. In this case, complicated levers and deflection systems are required in order to produce two different movable axes for helicopter control, in order, for example, to drive the rotor. Procurement of these apparatuses is thus expensive, and they are costly to maintain.

US 4,422,345 discloses a control lever, which can be mechanically pivoted about two axes arranged on different planes.

US 6,057,828 discloses an apparatus for determination of forces in virtual environments of any desired tools, in

which case it is possible to determine a force of any desired tool or handle or action.

US 4,555,960 discloses a joystick with six degrees of freedom, with the handle itself once again detecting two additional movements, via appropriate cross-linkages.

Patent Abstracts of Japan, Vol. 1997, No. 07 July 31, 1997 and JP 09 062392 A discloses a monitoring device in which a force sensor for determination of the load applied to the handle is arranged for this purpose between the handle and a corresponding holder. In this case, the handle is connected to a baseplate via two plates which are hinged with respect to one another, and can be moved on only one plane.

The present invention is based on the object of providing an apparatus of the type mentioned initially, which overcomes the stated disadvantages and by means of which an apparatus for exact control of vehicles, aircraft, helicopters and simulators is possible in a

simple and cost-effective manner, and which also allows active force feedback to the handle. In this case, the aim is to allow this apparatus to be accommodated well in confined installation spaces. A further aim is to improve the safety during operation.

The features of patent claim 1 lead to the achievement of this object.

In the case of the present invention, it is important that an apparatus is provided which is formed from a frame element with adjacent baseplates on each side. A baseplate is connected to a drive element, which is fitted with a force sensor, via a holding element, such that it can pivot about a first axis and allows a pivoting movement about this first axis, possibly by means of force feedback.

In order to move the handle about a further axis at right angles to this, a further drive element is connected to a baseplate of the frame element, and is preferably firmly connected to the structure of the vehicle, helicopter or simulator.

In one preferred exemplary embodiment, the two axes which are at right angles to one another are on different parallel planes, and are offset with respect to one another.

This ensures that different movement options and pivoting mechanisms of the handle are provided, which is particularly important for actuation of helicopter rotors.

In this case, one aim is to ensure that the one axis

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is offset upwards or downwards with respect to the other axis. This

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